

# PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2002-215632

(43)Date of publication of application : 02.08.2002

---

(51)Int.Cl. G06F 17/30  
G07F 17/00  
G10G 3/04  
G10H 1/00

---

(21)Application number : 2001-010587

(71)Applicant : NEC CORP

(22)Date of filing : 18.01.2001

(72)Inventor : HASHIMOTO TATSUO

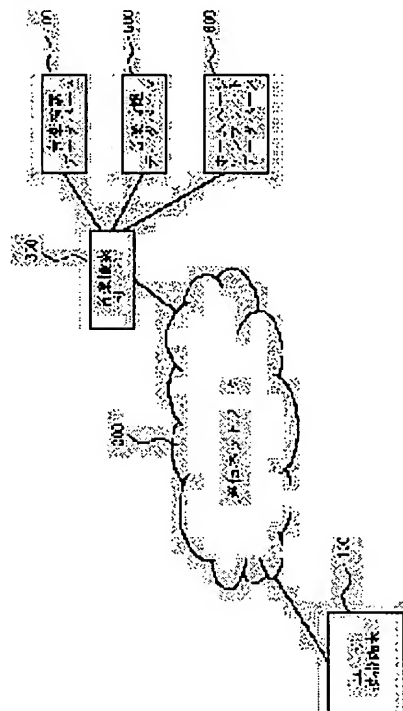
---

## (54) MUSIC RETRIEVAL SYSTEM, MUSIC RETRIEVAL METHOD AND PURCHASE METHOD USING PORTABLE TERMINAL

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To retrieve music information such as the title of a musical composition and the name of an artist using a portable terminal on music played around a user in a shopping street or through the television, the radio, or the like.

**SOLUTION:** Music played around the user is recorded using the user's portable terminal 100, and the user inquires of a music retrieval server 300 about the recorded music data through a communication network 200. The music retrieval server 300 collates the requested music data with music feature data previously registered in a database 400 and further retrieves music information registered in a database 500 to extract information on a piece of music inquired by the user, the name of the artist and the title of a recorded CD in order of reliability as candidates for every piece of music. The extracted retrieval result of the music retrieval server 300 is sent to the user's portable terminal 100 to allow the user to acquire the inquired music information. Further, the user can receive visual and audio service, purchase service, and the like of the corresponding music from the retrieval result.



### \* NOTICES \*

JPO and INPIT are not responsible for any damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.\*\*\*\* shows the word which can not be translated.

3.In the drawings, any words are not translated.

---

## CLAIMS

---

[Claim(s)]

[Claim 1] A music retrieval system characterized by comprising the following using a personal digital assistant which accesses a server via a communication network from a personal digital assistant.

A music retrieving database with which said server registered music characteristic data for every music.

Have a music information database which registered music information for every music, and said personal digital assistant, Have a request means which carries out retrieval required of the music information of the music data to transmit to said server by transmitting recorded music data, and said server, A reply means which creates music information of music which serves as a candidate by referring to a music retrieving database and a music information database based on said music data if retrieval required of music information of said music data is received as search results in order of reliability, and replies the created search results to said personal digital assistant.

[Claim 2] A music retrieval system using the personal digital assistant according to claim 1 having a displaying means which displays a display screen which stimulates a musical audition and purchase about the selected track name by said personal digital assistant's displaying said search results on a screen, and making a track name choose from the displayed screen.

[Claim 3] If music data recorded from said personal digital assistant is received, said reply means, A means to compute reliability similar by searching music characteristic data which extracts the music feature from said recorded music data, and is registered into said music retrieving database based on the extracted music feature, A music retrieval system using the personal digital assistant according to claim 1 having a means to search music information corresponding to a track name and its track name from said music information database in order with said computed high reliability, and to create said search results, and a means to transmit said search results to said personal digital assistant.

[Claim 4] A music retrieval system using the personal digital assistant according to claim 2 if said personal digital assistant is chosen [ an item to which an audition of said music displayed on said display screen is urged ], wherein it will receive music data for an audition of said selected track name from said server.

[Claim 5] A music retrieval system characterized by comprising the following using a personal digital assistant which accesses a server via a communication network from a splicing terminal. A music retrieving database with which said server registered music characteristic data for every music.

A mounting means which is provided with a music information database which registered music information for every music, and attaches media to which said splicing terminal recorded music data with a personal digital assistant.

Have a request means which carries out retrieval required of the music information of the music data to transmit to said server by transmitting music data recorded by said media, and said server, A reply means which creates music information of music which serves as a candidate by searching a music retrieving database and a music information database based on said music data if retrieval required of music information of said music data is received as search results in order of reliability, and replies the created search results to said splicing terminal.

[Claim 6] A music retrieval system using the personal digital assistant according to claim 5 having a displaying means which displays a display screen which stimulates a musical audition and purchase about the selected track name by said splicing terminal's displaying said search results on a screen, and making a track name choose from the displayed screen.

[Claim 7] If music data recorded from said splicing terminal is received, said reply means, A means to compute reliability similar by searching the music feature included in music characteristic data which extracts the music feature from said recorded music data, and is registered into said music retrieving database based on the extracted music feature, A music retrieval system using the personal digital assistant according to claim 5 having a means to

search music information corresponding to a track name and its track name from said music retrieving database in order with said computed high reliability, and to create said search results, and a means to transmit said search results to said splicing terminal.

[Claim 8]A music retrieval system using the personal digital assistant according to claim 6 if said splicing terminal is chosen [ an item to which an audition of said music displayed on said display screen is urged ], wherein it will receive music data for an audition of said selected track name from said server.

[Claim 9]A music retrieval system using the personal digital assistant according to claim 6 if said splicing terminal is chosen [ an item to which the purchase of said music displayed on said display screen is urged ], wherein it will receive purchase information of said selected track name from said server.

[Claim 10]A music retrieval system using the personal digital assistant according to claim 3 or 7, wherein said music feature contains a rhythm pattern, a tempo pattern, a melody pattern, a pitch pattern, and a sound length pattern.

[Claim 11]It is a music search method using a personal digital assistant which accesses a server via a communication network from a personal digital assistant, Prepare a music retrieving database which registered music characteristic data for every music, and a music information database which registered music information for every music for said server, and said personal digital assistant, By transmitting recorded music data, carry out retrieval required of the music information of the music data to transmit to said server, and said server, Music information of music which serves as a candidate by searching music characteristic data beforehand registered based on said music data when said music data was received from said music retrieving database is extracted in order of reliability, A music search method using a personal digital assistant characterized by what is replied to said personal digital assistant by making music information of music which serves as said the candidate who extracted into search results.

[Claim 12]A music search method using the personal digital assistant according to claim 11, wherein said personal digital assistant displays said search results on a screen and displays a display screen which stimulates a musical audition and purchase about a track name selected by making a track name choose from the displayed screen.

[Claim 13]From a personal digital assistant, via a communication network, are a music search method using a personal digital assistant which accesses a server, and said personal digital assistant, Retrieval required of music information of music data which recorded music, was connected to said server and recorded is performed, Music information for every track name which becomes the candidate who received by said retrieval required from said server is displayed on a screen, If a certain track name is chosen from music information for said every track name displayed on said screen, will receive music information of the selected track name from said server, and it will display on said screen, A music search method using a personal digital assistant which will be characterized by receiving music data for an audition of said selected track name from said server if an item urged to an audition is chosen from music information of said selected track name displayed on said screen.

[Claim 14]From a personal digital assistant, via a communication network, are a music buying method using a personal digital assistant which accesses a server, and said personal digital assistant, Retrieval required of music information for every music applicable to music data which recorded music and was recorded to said server is performed, Music information for every music which becomes the candidate who received by said retrieval required from said server is displayed on a screen, If a certain music is chosen from music information for said every music displayed on said screen, will receive music information of the selected music from said server, and it will display on said screen, A music buying method using a personal digital assistant receiving purchase information of said selected music from said server if an item to which purchase is urged is chosen from music information of said selected music displayed on said screen.

[Claim 15]From a personal digital assistant, via a communication network, are a music search method using a personal digital assistant which accesses a server, and said server, A music retrieving database which registered the music feature for every music, and a music information

database which registered music information for every music are prepared, Music data recorded to said personal digital assistant when retrieval required of music information of music data recorded from said personal digital assistant was received is made to transmit, Reliability similar by searching the music feature which extracts the music feature from said recorded music data, and is registered into said music retrieving database based on the extracted music feature is computed, A music search method using a personal digital assistant searching music information corresponding to music and its music from said music information database in order with said computed high reliability, and transmitting music information for said every searched music to said personal digital assistant.

[Claim 16]A music search method using the personal digital assistant according to claim 15, wherein said music search contains a rhythm pattern, a tempo pattern, a melody pattern, a pitch pattern, and a sound length pattern.

[Claim 17]It is a music search method using a personal digital assistant which accesses a server via a communication network from a splicing terminal, A music retrieving database which stored music characteristic data for every music, and a music information database which stored music information for every music are prepared for said server, Prepare media inserted in both a personal digital assistant and said splicing terminal, and said personal digital assistant, When said media which record music data to said media and by which said music data was recorded are inserted in said terminal, said splicing terminal, By transmitting music data recorded by said media to said server, carry out retrieval required of the music information of the music data to transmit to said server, and said server, Music information of music which serves as a candidate by searching music characteristic data beforehand registered based on said music data when said music data was received from said music retrieving database is extracted in order of reliability, A music search method using a personal digital assistant replying music information of music which serves as said the candidate who extracted to said splicing terminal.

---

[Translation done.]

**\* NOTICES \***

JPO and INPIT are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

---

**DETAILED DESCRIPTION**

---

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to the music retrieval system using the personal digital assistant with which the information on the music especially recorded with the personal digital assistant is retrieved, a music search method, and a sales method about the music retrieval system, music search method, and buying method which used the personal digital assistant.

[0002]

[Description of the Prior Art]The method of becoming a member of the method of purchasing as the method of music purchase conventionally based on the knowledge which the individual acquired on a magazine, television, etc., or accessing the music of individual liking via the Internet and coming to hand by audition in a record shop, and a record shop, sending a medium,

and getting is main.

[0003]

[Problem(s) to be Solved by the Invention]However, the conventional music buying method like the music which flows while favorite music can only be looked for and he is walking casually usually, only when an individual wants to know musical information, While the music which is pleasing when not expecting is flowing, there are many problems easily unsolvable even if he would like to know information, including the track name of the music, etc.

[0004]Even if this problem memorizes that the musical track name etc. may not be included in music, not memorizing words by once, and words and it memorizes that there is no service which can be searched immediately, and a melody, it is raised that it is difficult to tell the 3rd person exactly etc. Although it is recording music as an easy method for specifying music in this situation, Even if music is only recorded and it brings to a record shop, those who visit to a record shop to the problem that a salesclerk's memory is various, and the music which is not understood whether a user purchases have the problem that it is quite small.

[0005]In order that the purpose of this invention may solve the above problem, there is a user in the ability also of the music which felt inclined to flow by personal appearance to obtain the music information, music, etc. easily.

[0006]

[Means for Solving the Problem]In order to attain the above-mentioned purpose, a music retrieval system which used the 1st personal digital assistant of this invention, From a personal digital assistant, via a communication network, are a music retrieval system using a personal digital assistant which accesses a server, and said server, Have a music retrieving database which registered music characteristic data for every music, and a music information database which registered music information for every music, and said personal digital assistant, Have a request means which carries out retrieval required of the music information of the music data to transmit to said server by transmitting recorded music data, and said server, By referring to a music retrieving database and a music information database based on said music data, if retrieval required of music information of said music data is received. It is characterized by having a reply means which creates music information of music which serves as a candidate as search results in order of reliability, and replies the created search results to said personal digital assistant.

[0007]In a music retrieval system using the 1st above-mentioned personal digital assistant, said personal digital assistant, It is characterized by having a displaying means which displays a display screen which stimulates a musical audition and purchase about the selected track name by displaying said search results on a screen and making a track name choose from the displayed screen.

[0008]In a music retrieval system using the 1st above-mentioned personal digital assistant, said reply means, A means to compute reliability similar by searching the music feature included in music data which extracts the music feature from said recorded music data, and is registered into said music retrieving database based on the extracted music feature if music data recorded from said personal digital assistant is received, It is characterized by having a means to search music information corresponding to a track name and its track name from said music information database in order with said computed high reliability, and to create said search results, and a means to transmit said search results to said personal digital assistant.

[0009]In a music retrieval system using the 1st above-mentioned personal digital assistant, said personal digital assistant is characterized by receiving music data for an audition of said selected track name from said server, if an item to which an audition of said music displayed on said display screen is urged is chosen.

[0010]A music retrieval system using the 2nd personal digital assistant of this invention, From a splicing terminal, via a communication network, are a music retrieval system using a personal digital assistant which accesses a server, and said server, Have a music retrieving database which registered music characteristic data for every music, and a music information database which registered music information for every music, and said splicing terminal, A mounting means which attaches an archive medium which recorded music data with a personal digital assistant, Have a request means which carries out retrieval required of the music information of the music

data to transmit to said server by transmitting music data recorded by said media, and said server, By searching a music retrieving database and a music information database based on said music data, if retrieval required of music information of said music data is received. It is characterized by having a reply means which creates music information of music which serves as a candidate as search results in order of reliability, and replies the created search results to said splicing terminal.

[0011]In a music retrieval system using the 2nd above-mentioned personal digital assistant, said splicing terminal, It is characterized by having a displaying means which displays a display screen which stimulates a musical audition and purchase about the selected track name by displaying said search results on a screen and making a track name choose from the displayed screen.

[0012]In a music retrieval system using the 2nd above-mentioned personal digital assistant, said reply means, A means to compute reliability similar by searching the music feature included in music data which extracts the music feature from said recorded music data, and is registered into said music retrieving database based on the extracted music feature if music data recorded from said splicing terminal is received, It is characterized by having a means to search music information corresponding to a track name and its track name from said music retrieving database in order with said computed high reliability, and to create said search results, and a means to transmit said search results to said splicing terminal.

[0013]In a music retrieval system using the 2nd above-mentioned personal digital assistant, said splicing terminal is characterized by receiving music data for an audition of said selected track name from said server, if an item to which an audition of said music displayed on said display screen is urged is chosen.

[0014]In a music retrieval system using the 2nd above-mentioned personal digital assistant, said splicing terminal is characterized by receiving purchase information of said selected track name from said server, if an item to which the purchase of said music displayed on said display screen is urged is chosen.

[0015]In a music retrieval system using the 1st or 2nd above-mentioned personal digital assistant, said music feature is characterized by including a rhythm pattern, a tempo pattern, a melody pattern, a pitch pattern, and a sound length pattern.

[0016]A music search method using the 1st personal digital assistant of this invention, It is a music search method using a personal digital assistant which accesses a server via a communication network from a personal digital assistant, Prepare a music retrieving database which registered music characteristic data for every music, and a music information database which registered music information for every music for said server, and said personal digital assistant, By transmitting recorded music data, carry out retrieval required of the music information of the music data to transmit to said server, and said server, Music information of two or more track names which serve as a candidate by searching music characteristic data beforehand registered based on said music data when said music data was received from said music retrieving database is extracted in order of reliability, It is characterized by what is replied to said personal digital assistant by making music information of music which serves as said the candidate who extracted into search results.

[0017]In a music search method using the 1st above-mentioned personal digital assistant, said personal digital assistant is characterized by displaying said search results on a screen and displaying a display screen which stimulates a musical audition and purchase about a track name selected by making a track name choose from the displayed screen.

[0018]A music search method using the 2nd personal digital assistant of this invention, From a personal digital assistant, via a communication network, are a music search method using a personal digital assistant which accesses a server, and said personal digital assistant, Retrieval required of music information of music data which recorded music, was connected to said server and recorded is performed, Music information for every track name which becomes the candidate who received by said retrieval required from said server is displayed on a screen, If a certain track name is chosen from music information for said every track name displayed on said screen, will receive music information of the selected track name from said server, and it will display on said screen, If an item urged to an audition is chosen from music information of said selected

track name displayed on said screen, it is characterized by receiving music data for an audition of said selected track name from said server.

[0019]A music buying method using the 1st personal digital assistant of this invention, From a personal digital assistant, via a communication network, are a music buying method using a personal digital assistant which accesses a server, and said personal digital assistant, Retrieval required of music information for every music applicable to music data which recorded music and was recorded to said server is performed, Music information for every music which becomes the candidate who received by said retrieval required from said server is displayed on a screen, If a certain music is chosen from music information for said every music displayed on said screen, will receive music information of the selected music from said server, and it will display on said screen, If an item to which purchase is urged is chosen from music information of said selected music displayed on said screen, it is characterized by receiving purchase information of said selected music from said server.

[0020]A music search method using the 3rd personal digital assistant of this invention, From a personal digital assistant, via a communication network, are a music search method using a personal digital assistant which accesses a server, and said server, If retrieval required of music information of music data which prepared a music retrieving database which registered the music feature for every music, and a music information database which registered music information for every music, and was recorded from said personal digital assistant is received, Reliability similar by searching the music feature which extracts the music feature from said recorded music data, and is registered into said music retrieving database based on the extracted music feature is computed, Music information corresponding to music and its music is searched from said music retrieving database in order with said computed high reliability, and it is characterized by transmitting music information for said every searched music to said personal digital assistant.

[0021]In a music search method using the 3rd above-mentioned personal digital assistant, said music search is characterized by including a rhythm pattern, a tempo pattern, a melody pattern, a pitch pattern, and a sound length pattern.

[0022]A music search method using the 4th personal digital assistant of this invention, It is a music search method using a personal digital assistant which accesses a server via a communication network from a splicing terminal, A music retrieving database which stored music characteristic data for every music, and a music information database which stored music information for every music are prepared for said server, Prepare media inserted in both a personal digital assistant and said splicing terminal, and said personal digital assistant, When said media which record music data to said media and by which said music data was recorded are inserted in said terminal, said splicing terminal, By uploading music data recorded by said media to said server, carry out retrieval required of the music information of the music data to transmit to said server, and said server, If said music data is received, by searching music characteristic data beforehand registered based on said music data from said music retrieving database, music information of music which serves as a candidate is extracted in order of reliability, and it is characterized by replying music information of music which serves as said the candidate who extracted to said splicing terminal.

[0023]

[Embodiment of the Invention]When drawing 1 is referred to, a 1st embodiment of this invention comprises the following:

User personal digital assistant 100.

The music retrieval server 300 which performs music search.

The communication networks 200, such as the Internet which connects these.

The music retrieving database 400 connected to the music retrieval server 300, the music information database 500 connected to the music retrieval server 300, and the homepage template data base 600 connected to the music retrieval server 300.

The music retrieval server 300 accesses the music retrieving database 400 and the music information database 500 for search.

[0024]The user personal digital assistant 100 can be attached to the regular bodies, such as a cellular phone and a portable personal computer, and has a music recording function. The music



recording function in this case the music to record PCM (Pulse Code Modulation), It changes into the music data of data formats, such as MP3 (MPEG Audio Layer 3), and memorizes to the storage parts store (being a nonvolatile memory for example, flash memory) which is not illustrated. The user personal digital assistant 100 of this example of an embodiment is connected to the communication network 200 by operating by programmed control by the processor which is not illustrated, and connecting the apparatus of itself or attachment.

[0025]The music retrieval server 300 is prepared by the donor of service, and is constituted by information processors, such as a workstation server which operates by programmed control by a processor. The music retrieval server 300 receives the music data sample which the user recorded with the user personal digital assistant 100, Extract the music feature from the received music data sample, and it compares with the music characteristic data in which the music retrieving database 400 is registered, After searching music ID which agrees most in a user's inquiry, it has a function which transmits the information about the music which accessed the music information database 500 from searched music ID, and the user recorded using the user personal digital assistant 100 to the user personal digital assistant 100.

[0026]The music retrieving database 400 is used by the music retrieval server 300, and holds music ID which can specify as a meaning the music characteristic data and music which the music retrieval server 300 needs for searching music using the sound recording music data sent by the user. It realizes on the nonvolatile recording medium device (for example, magnetic disk drive) which can do read-out writing, and the music retrieving database 400 is assigned to the area in the recording medium device.

[0027]The music information database 500 is a database holding the information relevant to music, such as a track name, a record company name, an artist name, sample sound easy data for an audition, and music data for download sale, and is managed by the meaning by music ID. After searching what is considered that the music retrieval server 300 agrees in a user's recorded data from the music retrieving database 400 and obtaining music ID, musical detailed information is taken out from the music information database 500 using the music ID. The music information database 500 is recorded on the nonvolatile recording medium device (for example, magnetic disk) which can do read-out writing, and is assigned to the area in the recording medium device. The music information of the music information database 500, For every music ID, music ID, a track name, a composer name, an artist name, CD album name, A CD number, a record company name, the sample sound easy data (MP3 etc.) for an audition, the music data for download sale, lyrics data, a download price, a words download price, CD single purchase price, the purchase price (it is plurality when there are more than one) of CD album, etc. are included.

[0028]The homepage template data base 600, The screen information of the top of the homepage displayed on the screen of the user personal digital assistant 100, menu screen information, music search input screen information, and various screen information including a search-results screen format (for example, compatible format which inputs a result like drawing 3) are saved.

[0029]When drawing 8 is referred to, it is a block diagram showing the composition of the functional block in a music retrieval server when the music retrieval server 300 receives the music data recorded from the user personal digital assistant 100, and comprises the control section 310 and the storage parts store 320.

[0030]The control section 310 operates by programmed control by a processor, and contains the music data conformity part 311, the music feature extraction part 312, the note retrieval part 313, the search-results preparing part 314, and the search-results processing section 315.

[0031]The storage parts store 320 is a memory which can do read-out writing, and is assigning the area of the music data area 321, the music feature data area 322, the collated result table 323, and the search-results table 324.

[0032]The music data area 321 is a work area where music data with the demand of music search is saved temporarily. The music feature data area 322 is a work area where the data which extracted the music feature from the music data area is saved temporarily. The collated result table 323 is a table for works which saves music ID and reliability (hit ratio) at each to the extracted music feature, and whenever there is a demand of music search, it is created. The



search—results table 324 is a table for works which saves music ID, a track name, a composer name, an artist name, and reliability in order with high reliability.

[0033]If the music data which the music retrieval server 300 received is compressed data, the music data conformity part 311 will be thawed, will be saved in the music data area 321, and will pass control to the music feature extraction part 312. The music data in which it was thawed in this case is a data format in which music feature extraction is possible. If the data format after thawing is not the form in which music feature extraction is possible, it changes and saves in the music data area 321. By the case where it is not the data in which the received music data was compressed, if it is not a data format in which feature extraction is possible, it will change into the data format in which music feature extraction is possible, and will save in the music data area 321 of the storage parts store 320, and control will be passed to the music feature extraction part 312. By the case where it is not the data in which the received music data was compressed, if it is a data format in which music feature extraction is possible, the received music data will be saved in the music data area 321, and control will be passed to the music feature extraction part 312.

[0034]Next, operation of a 1st embodiment is explained with reference to drawing 1, drawing 2, and drawing 3. The user is always carrying the user personal digital assistant 100 portable in usual states, such as a cellular phone. While the user is walking all over the town, he is interested in the music which flows from a store, television, radio, etc., and when I wish to acquire information detailed about the music, the music is recorded using the user personal digital assistant 100 currently carried. Here, it is not necessary to record musical [ all ] and a part can be recorded to the user personal digital assistant 100.

[0035]A user musical [ through which it is flowing all over the town / a part of ] now through the microphone (not shown) with which the user personal digital assistant 100 is equipped the user personal digital assistant 100, It records in data formats, such as PCM and MP3, and a data compression is further carried out if necessary, and the music data recorded to the storage parts store within a terminal which is not illustrated is saved (Step S1).

[0036]A user accesses the music retrieval server 300 via the communication network 200 using the operation key of the user personal digital assistant 100 from the user terminal 100. Then, if the music retrieval server 300 has access from the user personal digital assistant 100, The menu screen of a homepage is displayed on the screen of the user personal digital assistant 100 by reading menu screen information from the homepage template data base 600, and transmitting to the user personal digital assistant 100 via the communication network 200. If a user chooses a music search service from a menu screen, the user personal digital assistant 100 will transmit the information which chose the music search service to the music retrieval server 300 via the communication network 200. If the selection information of a music search service is received, in order to require upload of the recorded music, the music retrieval server 300 reads music search input screen information from the homepage template data base 600, and transmits to the user personal digital assistant 100 via the communication network 200. The user personal digital assistant 100 displays a music search input screen on a screen. If the information, including for example, the place of a file to upload, a file name, etc., which a user needs for a music search input screen is inputted or chosen, the user personal digital assistant 100 will upload the music recorded via the communication network 200 to the music retrieval server 300 (Step S2).

[0037]The music retrieval server 300 receives the music data which the user recorded (Step S3). The music retrieval server 300 discovers music ID of the music which agrees above the reliability beforehand decided to the music to which the user recorded the received music data with reference to the music retrieving database 400 (step S4). Next, the music information database 500 is used for the music retrieval server 300 from searched music ID, The information (search results) about the music which users, such as a track name, an artist name, and a record company name, recorded is taken out (Step S5), In order to send music information to the user personal digital assistant 100, it is processed by adding search results to the search—results screen information format read from the homepage template data base 600 (Step S6), and it transmits to a user's user personal digital assistant 100 further (Step S7).

[0038]The information (search results) about the music which the user recorded is received from

the music retrieval server 300 via the communication network 200 (Step S8), and the user personal digital assistant 100 displays it on a screen (step S9).

[0039]Thus, the user can get the information (search results) about the sound recording music which the music retrieval server 300 was asked from the contents displayed on the screen of the user personal digital assistant 100. The display example of the search results which the user personal digital assistant 100 in this case displays on a screen is shown in drawing 3.

[0040]Namely, in Steps S5–S7, the music retrieval server 300 reads a track name and a composition name applicable for every music ID, and a lyrics name from the music information database 500. The format of a search–results display is read from the homepage template data base 600. By inserting search results including the information which read the point, and reliability, it is processed as search–results picture information, and this processed search–results picture information is transmitted to the user personal digital assistant 100 via the communication network 200.

[0041]Next, processing to Step S3 – Step S7 is explained with reference to drawing 6 in more detail.

[0042]If the music retrieval server 300 receives music data, the control section 310 which passed control to the control section 310 and was passed control will pass control to the music data conformity part 311. Compressed data will be thawed if the music data conformity part 311 passed control has necessity. If the recorded music is not a data format in which music feature extraction is possible, after changing into the data format which can be extracted, music data is stored in the music data area 321 of the storage parts store 320, and control is passed to the music feature extraction part 312 for control.

[0043]The music feature extraction part 312 passed control extracts the music features, such as a rhythm pattern, a melody pattern, a tempo pattern, a pitch pattern, and a sound length pattern, by searching the data stored in the music data area 321. If the example of the extraction method in this case is explained, when the music data stored in the music data area 321 comprises a note containing a rest, It is considered as one character by dividing a rest as a delimiter, and is a pitch (in order to display the pitch of sound of a note numerically, one character). A character string (one character string is formed for every pitch and sound length) is created by composition and every sound length (in order that sound length may consider it as zero start bordering on a rest and may show the length of the position of a note numerically, it constitutes one character from two or more numerical values) as a pattern for two or more numerical values. Thus, if the music feature of the recorded music is extracted, the music feature extraction part 312 will be stored in the music feature data area 322 of the storage parts store 320, and will pass control to the music retrieval part 313.

[0044]On the other hand, music ID and the music characteristic information corresponding to it are formed in the music retrieving database 400. Therefore, from the music feature extraction part 312, the music retrieval part 313 passed control reads the music feature stored in the music feature data area 322, and starts search of the music retrieving database 400 based on the read music feature. As shown in drawing 7 as an example, when it is music characterized by the pitch pattern and a sound length pattern, The rate (ratio of how many to have matched in the character string) which a pitch pattern and a sound length pattern hit is computed, respectively, searching the music retrieving database 400, and it asks for reliability. How to search based on the statistical data of the music feature is also considered. The music retrieval part 313 will be disregarded if it is below the reliability decided beforehand. After search of music ID to the music feature is completed, the collated result table 323 is edited by rearranging sequentially from what has high reliability. When there are many results, it leaves even the maximum number beforehand set up from what has high reliability, and it deletes about the portion beyond it, and control is passed to the search–results preparing part 314.

[0045]The search–results preparing part 314 passed control based on music ID saved on the collated result table 323, Search the music information database 500, read music information applicable to music ID, such as a track name, a composer name, and an artist name, from the music information database 500, and write in the search–results table 324, and. The reliability at that time is read from the collated result table 323, and it writes in the search–results table 324.

After the retrieval processing to the music information database 500 to all the music ID extracted on the collated result table 323 is completed, the search-results preparing part 314 passes control to the search-results processing section 315 for control, in order to send to the user personal digital assistant 100.

[0046]The search-results processing section 315 passed control reads a search-results screen format from the homepage template data base 600, Control is passed to the control section 310 as search-results screen information by adding the data stored in the search-results table 324 to the read format. The passed control section 310 transmits search-results screen information to the personal digital assistant 100 with a demand.

[0047]Namely, the control section 310 of the music retrieval server 300, Based on the recorded music data, by searching the music retrieving database 400 and the music information database 500, the music information for every music which becomes the order of reliability with a candidate will be searched, and the search results searched and obtained will be transmitted to the personal digital assistant 100.

[0048]Various methods of detecting reliability are considered in the explanation which asks for the above-mentioned reliability. The music retrieving database 500 is prepared as a database which performs beforehand music feature extraction of the music used as a retrieval object first, and makes an index the extracted music feature. After the control section 310 of the music retrieval server 300 receives the recorded music, it performs music feature extraction of the received music, and performs search from the music retrieving database 500 by using the music feature as a key. For example, when the music feature of the recorded music data is extracted as ten patterns, About the music in which all of the ten patterns are contained, 100% of reliability and eight cases can consider various methods, such as a method of deciding reliability with the number of characters which extracted the pattern and matched, so that it may become the method of judging like 80% of reliability, and the character string of length decided beforehand.

[0049]It is not necessary to upload all the music data recorded from the user personal digital assistant 100 to the music retrieval server 300, and may be made to upload some recorded music data in the above-mentioned explanation. In this case, air time is shortened from the way of all transmitting the recorded music data. However, since the music feature which can be extracted decreases and retrieval precision will become low if sound recording time becomes short, the sound recording needs to be the length of the grade which can fully carry out feature extraction.

[0050]Next, a 2nd embodiment of this invention is described with reference to drawings. A 2nd embodiment of this invention shows the same composition as the block diagram shown by a 1st embodiment, and is different from a 1st embodiment in that the music retrieval server 300 added the operation relevant to search results.

[0051]Namely, the homepage template data base 600, The screen information of the top of the homepage displayed on the screen of the user personal digital assistant 1 shown by a 1st embodiment, Besides a search-results screen format (for example, compatible format which inputs a result like drawing 3), It is different from a 1st embodiment in that various screen information including the music information screen format (for example, compatible format which inputs a result like drawing 4) corresponding to a track name, and a purchase screen format (for example, compatible format which inputs a result like drawing 5) is saved.

[0052]Next, operation of a 2nd embodiment of this invention is explained with reference to drawing 1 - drawing 5. Since it is the same as operation to Step S1 of a 1st embodiment - S9, explanation is omitted. A track name chooses from the search results displayed on the screen of the user personal digital assistant 100. If the track name 1 is chosen here, the user personal digital assistant 100 will transmit the music information demand (it is a hyperlink to which information is made as for a demand about music ID, and from a screen, it is hidden and is) of music ID which is the selected track name to the music retrieval server 300 via the communication network 200.

[0053]Based on music ID, the music retrieval server 300 searches the music information database 500, and reads an artist name, a music title, CD album name, a CD number, and a record company name from applicable music ID, and. A music information screen information

format is read from the homepage template data base 600. By adding the music information read to the music information screen information format, the music retrieval server 300 is processed and transmits the processed music information screen information to the user personal digital assistant 100 via the communication network 200. The user personal digital assistant 100 will display music information on a screen, if music information screen information is received.

[0054]The user can check the information about the sound recording music data which the music retrieval server 300 was asked with the user personal digital assistant 100. That is, like the example shown by drawing 3, search results are displayed, and the detailed information on music is displayed like drawing 4 by choosing the music of search results, and the contents displayed on the user personal digital assistant 100 come to be able to perform audition of the music concerned, and purchase via the communication network 200.

[0055]A user chooses a musical audition or purchase from the music information by a music result like drawing 4 on the screen of the user personal digital assistant 100. When a user chooses an audition, the audition demand of the music chosen from the user personal digital assistant 100 is transmitted to the music retrieval server 300 via the communication network 200. The music information database 500 will be searched based on music ID, and the music retrieval server 300 will transmit the music for the audition of applicable music ID (for example, MP3 data) to the user terminal 100, if the audition demand of the music to wish is received. The user personal digital assistant 100 will be memorized to a storage parts store, if the music data for an audition is received. If a user specifies the music for an audition which started and downloaded reproducing software, the user personal digital assistant 100 will read the music for an audition from a storage parts store, and will be reproduced. That is, the user can play the music for an audition with the user personal digital assistant 100.

[0056]When a user chooses purchase on the screen of drawing 4 of the user personal digital assistant 100, the goods list about the music searched like drawing 5 is displayed on the screen of the user terminal 100, and can purchase goods via the communication network 200 by choosing goods to purchase.

[0057]That is, the user personal digital assistant 100 transmits a musical purchase request to the music retrieval server 300 via the communication network 200. The music retrieval server 300 will search the music information database 500 based on music ID, if the musical purchase request to wish is received. The purchase information (MP3 download, words download, CD single purchase, each purchase price information on album purchase information) of applicable music ID is read, and a purchase information screen information format is read from the homepage template data base 600. The music retrieval server 300 is processed by adding the purchase information read to the purchase information screen information format, and transmits the processed music information screen information to the user terminal 100. The user personal digital assistant 100 will display the purchase information shown in a screen by drawing 5, if purchase information screen information is received.

[0058]If drawing 5 is referred to, about a musical download sale and sale of words, By choosing from on the screen of the user personal digital assistant 100, and downloading to the user personal digital assistant 100 immediately on-line. There are two kinds of sales styles, what can be used with the user personal digital assistant 100, and the thing which chooses from on the screen of the user personal digital assistant 100, and sends an article to a user by parcel delivery service etc. like CD sale later.

[0059]Next, a 3rd embodiment of this invention is described with reference to drawings. When the user personal digital assistant does not have a communication function, the case where a communication function is inextensible is explained using drawing 8. When drawing 8 is referred to, a 3rd embodiment of this invention, The user personal digital assistant 101 without a communication function is connected to the splicing terminal 110. (It connects by USB, radio, etc.) It carries out and the point of having connected the splicing terminal 110 to the communication network 200 is different from 1st and 2nd embodiments that have connected the user personal digital assistant 100 with a communication function to the communication network 200.

[0060]The user personal digital assistant 101 has a musical recording function like the user

personal digital assistant 100 of a 1st embodiment. Therefore, download of the recorded music and the music tried listening and purchased is performed between the splicing terminal 110 and the user personal digital assistant 101. That is, except for the interface between the splicing terminal 110 and the user personal digital assistant 101, since composition and operation are the same as 1st and 2nd embodiments, explanation is omitted.

[0061]Next, a 4th embodiment of this invention is described with reference to drawings. When the user personal digital assistant does not have a communication function, the case where a communication function is inextensible is explained using drawing 9. When drawing 9 is referred to, a 4th embodiment of this invention, The splicing terminal 111 connected to the communication network 200, and the user personal digital assistant 102 without a communication function, The point of using the dismountable media 120 common to the user personal digital assistant 102 and the splicing terminal 111 is different from 1st and 2nd embodiments using the user personal digital assistant 100 with the communication function linked to the communication network 200.

[0062]The user personal digital assistant 101 writes the sound recording of music data in the media 120. The media 120 are nonvolatile memory cards.

[0063]When accessing the music retrieval server 300 via the communication network 200 using the splicing terminal 111, the media 120 which wrote in music data are inserted. That is, recorded music is performed via the media 120 between the splicing terminal 110 and the user personal digital assistant 101. The splicing terminal 110 performs musical retrieval required, download, etc. Therefore, the point that the interfaces between the splicing terminal 110 and the user personal digital assistant 101 are the media 120, Instead of the splicing terminal 110 being the user personal digital assistant 100, except for the point which communicates with the music retrieval server 300, since composition and operation are the same as 1st and 2nd embodiments, explanation is omitted.

[0064]The media 120 whose removal is possible are made to carry out sound recording record of the music with the user personal digital assistant 102, as shown in a 4th embodiment, The music recorded by attaching to the splicing terminal 111 connectable with the communication network 200 can be accessed now, and the splicing terminal 111 can access the music data recorded with the user personal digital assistant 101 to the music retrieval server 300 via the communication network 200.

[0065]Although the user personal digital assistant 100,101,102 made PCM and MP3 the example in the above-mentioned 1st - a 4th embodiment as a music data form in the case of saving the music data to record, Even if other forms (for example, WAV, G.711, G.722, G.728, G.729, ADPCM, VSELP, CS-CELP, LD-CELP, RPE-LTP, PSI-CELP, WMA form) are used and it makes it save, It cannot be overemphasized that what is necessary is just to change so that it may correspond to the file format which can carry out music feature extraction in the music data conformity part 311 of the server 300.

[0066]In the above-mentioned 1st - a 4th embodiment, although it connects with the music retrieval server 300 via the communication network 200, and these connection methods include the following methods, it cannot be overemphasized that all are contained in this invention. Namely, it connects with an Internet Service Provider via a radio network and a telephone network, Via the method of connecting with a music retrieval server via an Internet Service Provider (managing server which the provider has managed), a radio network, and a telephone network, A method linked to the music retrieval server with which the Internet Service Provider itself is giving his service, Although there are the method (for example, i-mode of NTT DoCoMo, J-phone, WAP of KDDI) of connecting with the managing server of a cellular phone company (for example, NTT DoCoMo, J-phone, KDDI) via a radio network, and connecting with a music retrieval server via the managing server, etc., It cannot be overemphasized that the communication network 200 in this invention includes the above-mentioned means of communication to \*\*\*\*\* in the music retrieval server 300.

[0067]As explained above, a user records the music which felt inclined to flow into personal appearance to a user's personal digital assistant, and via a communication network, Since he is trying for a music retrieval server to send search results to a user's personal digital assistant if

the music which accessed the music retrieval server and was recorded is uploaded, the user can acquire the information about the asked music. Since he is trying to display a music result on the screen of a personal digital assistant, audition and purchase can be performed from the screen.  
[0068]

[Effect of the Invention]As explained above, although this invention is usually casual and music is full of the surroundings of the body, when pleasing music has jumped into the ear at a certain time, and solving desire of the user who wants to know about the title and artist, the effect of this invention is class work.

[0069]Since he is trying for the reason to obtain the music information recorded by sending the music data which recorded and recorded music on that spot using an always portable personal digital assistant, It is because music information, such as a track name, can be known on that spot in an instant, the music can also be tried listening it and purchased further, so the music with which a user is pleased can be obtained easily.

---

[Translation done.]

**\* NOTICES \***

JPO and INPIT are not responsible for any damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.\*\*\*\* shows the word which can not be translated.

3.In the drawings, any words are not translated.

---

**DESCRIPTION OF DRAWINGS**

[Brief Description of the Drawings]

[Drawing 1]It is a block diagram of the system in which a 1st or 2nd embodiment of this invention is shown.

[Drawing 2]The flow chart which shows operation when music retrieval required between each device of drawing 1 is performed is shown.

[Drawing 3]It is an example of composition which shows the contents of the search results displayed on the screen of the user personal digital assistant of drawing 1.

[Drawing 4]It is an example of composition which shows the contents of the music information of a certain track name displayed on the screen of the user personal digital assistant of drawing 1.

[Drawing 5]It is an example of composition which shows the contents of the purchase information of a certain track name displayed on the screen of the user personal digital assistant of drawing 1.

[Drawing 6]It is a block diagram showing the functional constitution of a music retrieval server when the music retrieval server of drawing 1 receives the music data of retrieval required.

[Drawing 7]It is a schematic diagram showing how to ask for the detection ratio of the pitch pattern of the pitch and sound length extraction part of drawing 6, and a sound length pattern.

[Drawing 8]It is a block diagram of the system in which a 3rd embodiment of this invention is shown.

[Drawing 9]It is a block diagram of the system in which a 4th embodiment of this invention is shown.

[Description of Notations]

100,101,102 User personal digital assistant

110,111 Splicing terminal

120 Media

200 Communication network  
300 Music retrieval server  
310 Control section  
311 Music data conformity part  
312 Music feature extraction part  
313 Music retrieval part  
314 Search-results preparing part  
315 Search-results processing section  
320 Storage parts store  
321 Music data area  
322 Music feature data area  
323 Collated result table  
324 Search-results table  
400 Music retrieving database  
500 Music information database  
600 Homepage template data base

---

[Translation done.]

\* NOTICES \*

JPO and INPIT are not responsible for any  
damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

---

DRAWINGS

[Drawing 3]

検索結果	信頼度
曲名 1	95%
作曲 : 作曲者A	
アーティスト名: アーティストB	
曲名 2	88%
作曲 : 作曲者B	
アーティスト名: アーティストC	
曲名 3	75%
作曲 : 作曲者C	
アーティスト名: アーティストD	

[Drawing 4]



音楽情報

曲名 1

試聴購入

作曲 : 作曲者A  
アーティスト名: アーティストB  
CDアルバム: アルバムC  
CD番号: CD#123456  
レコード会社: Dレコード

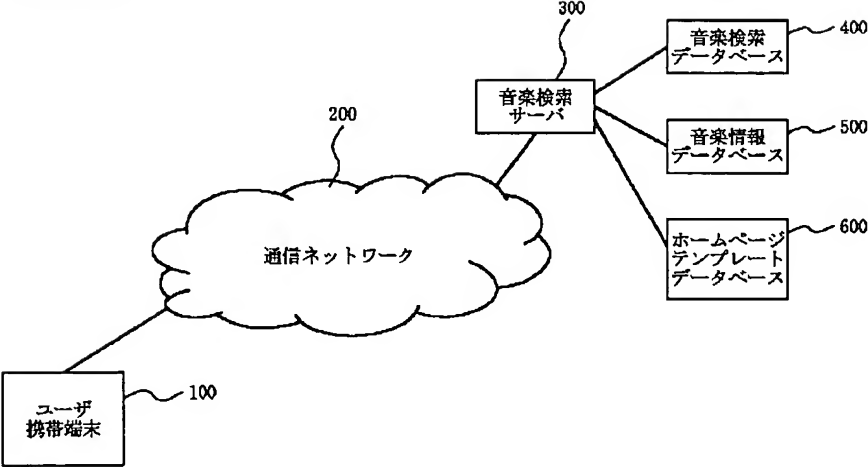
[Drawing 5]

購入

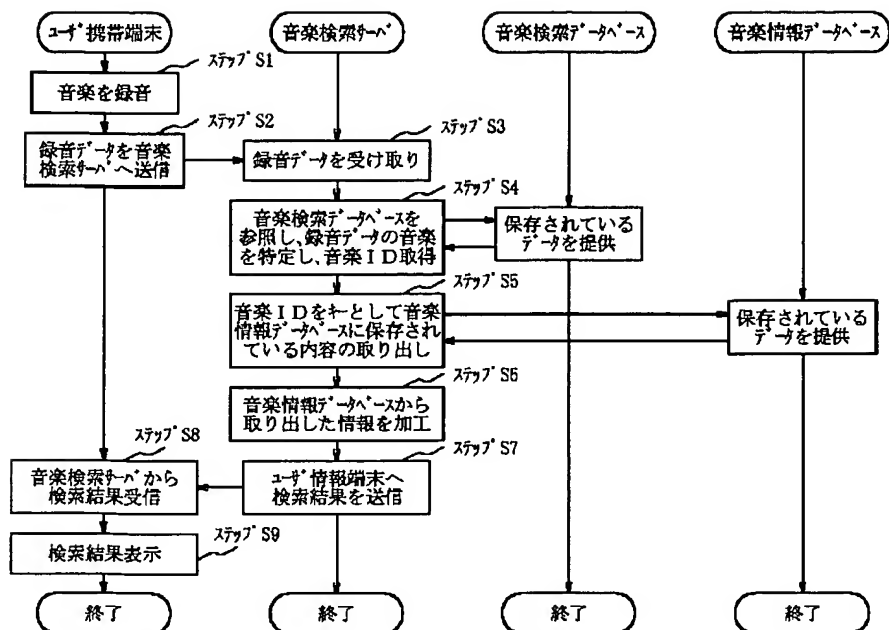
曲名 1

MP3ダウンロード ¥500  
歌詞ダウンロード ¥150  
CDシングル購入 ¥800  
曲名 1 収録CDアルバム  
アルバムA購入 ¥2500  
アルバムB購入 ¥2200

[Drawing 1]

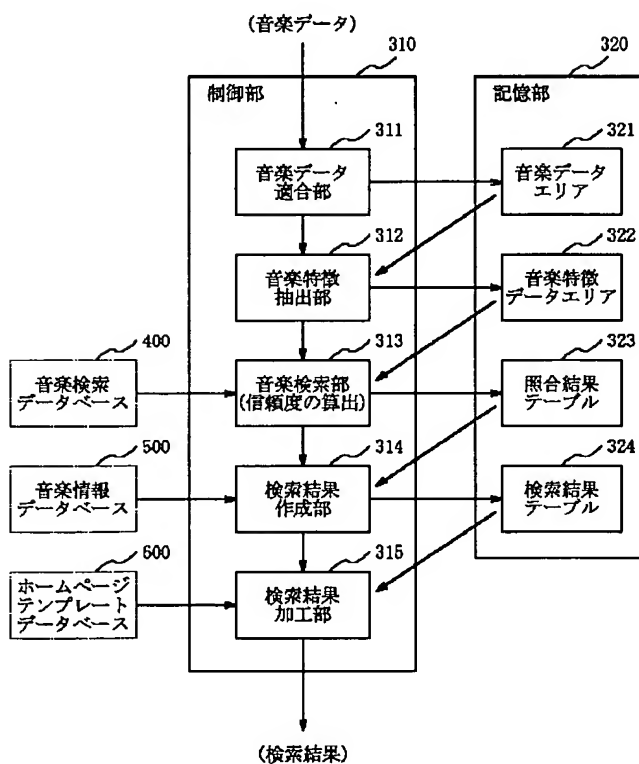


[Drawing 2]



[Drawing 6]

音楽データ検索要求時の音楽検索サーバ内の機能構成



[Drawing 7]

# 音高パターンおよび音長パターンの検出率(ヒット率)の求め方

## (1) 音高の場合のヒット率の例

音高・音長データエリアの文字列

(A) A (B) (C) (D) B B (A) (D) (E) → 7個ヒット

音楽検索データベースの文字列

(A) (B) (C) (D) E (A) (D) (E)

$$\text{音高パターンヒット率} = 70\% (7/10)$$

## (2) 音長の場合のヒット率の例

音高・音長データエリアの文字列

(C) (D) (A) B (C) (C) D E (A) (A) → 8個ヒット

音楽検索データベースの文字列

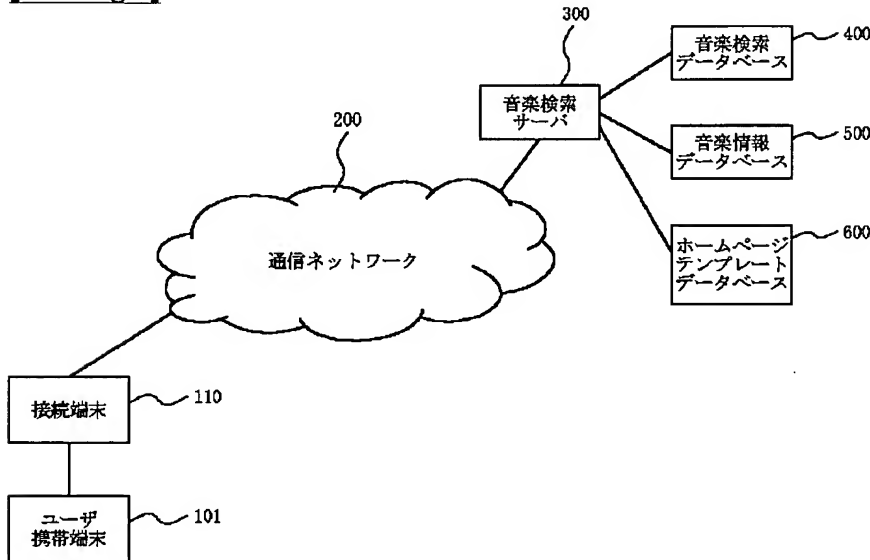
(C) (D) (A) (C) (C) E (A) (A)

$$\text{音長パターンヒット率} = 80\% (8/10)$$

備考：音高と音長の割合を例えば50：50にすると、

$$\text{信頼度} = 0.5 \times 70 + (1-0.5) \times 80 = \underline{\underline{75\%}}$$

[Drawing 8]



[Drawing 9]

